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STAGE_t: Tax Instruments & Revenues

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Outline

- Introduction
  - Policy instruments
  - Critical in price driven models – price 'wedges'
  - Greater 'sophistication' in tax focused CGE models
- Tax Instruments
- Calibration of Tax Rates
- Tax Revenue Variables

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Tax Instruments

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Tax Instruments

Instrument	Name	Base	Behaviour
Import duties	TM_c	$PWM_c * QM_c$	*ad valorem*
Export taxes	TE_c	$PWE_c * QE_c$	*ad valorem*
Sales taxes	TS_c	$PQS_c * QQ_c$	*ad valorem*
Sales taxes2	TSS_c	$PQS_c * QQ_c$	*ad valorem*
Excise taxes	TEX_c	QQ_c	*specific*
Value added tax (VAT)	TV_c	$PQD_c * QCD_c$	*ad valorem*
Production taxes	TX_a	$PX_a * QX_a$	*ad valorem*
Factor use taxes	$TF_{f,a}$	$WFA_{f,a} * FD_{f,a}$	*ad valorem*
Factor income taxes	TYF_f	YF_f	*ad valorem*
Household income taxes	TYH_h	YH_h	*ad valorem*
Enterprise income taxes	TYE_e	YE_e	*ad valorem*

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Calibration of Tax Rates

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Calibration – Commodity Taxes

```
* ## Valuations at Basic and Purchaser Prices

Parameter
 Vdmd_PP(c)      Domestic absorption at purchaser prices
 Vdmd_BP(c)      Domestic absorption at basic prices
 ;

 Vdmd_PP(c)   = SUM(m,SAM(c,m)) + SUM(a,SAM(c,a))
               + SUM(h,SAM(c,h))
               + SUM(e,SAM(c,e))+ SUM(g,SAM(c,g))
               + SUM(i,SAM(c,i)) + SAM(c,"dstoc") ;

 Vdmd_BP(c)   = Vdmd_PP(c)
                - [SUM(m,SAM(m,c)) + SAM("saltax",c)
                   + SAM("ssaltax",c) + SAM("ectax",c)
                   + SAM("vattax",c)]   ;
```


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Calibration – Commodity Taxes

```
TM0(c)$cm(c)  = SAM("imptax",c)/SAM("row",c)  ;
```

$$\frac{VTM_c}{VWM_c}$$

```
TE0(c)$ce(c)  = SAM("exptax",c)/SAM(c,"row")  ;
```

$$\frac{VTE_c}{VWE_c}$$

```
TS0(c)$Vdmd_BP(c)  = SAM("saltax",c)/Vdmd_BP(c)  ;
```

$$\frac{VTS_c}{VQS_c}$$

```
TSS0(c)$Vdmd_BP(c)  = SAM("ssaltax",c)/Vdmd_BP(c);
```

$$\frac{VTSS_c}{VQS_c}$$

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Calibration – Commodity Taxes

```
TEX0(c)$QQ0(c)  = SAM("ectax",c)/QQ0(c)  ;
```

$$\frac{VTEX_c}{QQ_c}$$

```
TV0(c)$[SUM(h,SAM(c,h))  - SAM("vattax",c)]
    = SAM("vattax",c)/
         [SUM(h,SAM(c,h))  - SAM("vattax",c)] ;
```

$$\frac{VTV_c}{\sum_h VQCD_{c,h}}$$

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Calibration – Activity Taxes

```
TX0(a)$SAM("total",a)
              = SAM("indtax",a)/SAM("total",a) ;
```

$$\frac{VTX_a}{VX_a}$$

```
TF0(f,a)$SAM(f,a)
        = SUM[tff$map_f_tff(f,tff),SAM(tff,a)]
                   /SAM(f,a) ;
```

$$\frac{VTF_{f,a}}{VFD_{f,a}}$$

```
Set

map_f_tff(f,tff) Factor taxes to factors /
 #f:#tff
  /  ;
```

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Calibration – Income Taxes

```
TYF0(f)$[SAM("total",f) - SAM("i_s",f)]
             = SAM("facttax",f)/
               [SAM("total",f) - SAM("i_s",f)] ;
```

$$\frac{VTYF_f}{VYFDISP_f}$$

```
TYH0(h)$SAM("total",h)
             = SAM("dirtax",h)/SAM("total",h) ;
```

$$\frac{VTYH_h}{VYH_h}$$

```
TYE0(e)$SAM("total",e)
             = SAM("dirtax",e)/SAM("total",e) ;
```

$$\frac{VTYE_e}{VYE_e}$$

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Tax Revenue Variables

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Why Tax Revenue Variables?

- Unnecessary
  - the model is fine without them
- Reasons
  - Summary variables
  - Target variables
  - Can make the model easier to read
  - Habit?!

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Tax Revenue Equations

```
MTAXEQ..
   MTAX =E= SUM[c,TM(c)*PWM(c)*QM(c)*ER] ;
ETAXEQ..
   ETAX =E= SUM[c,TE(c)*PWE(c)*QE(c)*ER] ;

STAXEQ..
   STAX =E= SUM[c,TS(c)*PQS(c)*QQ(c)] ;
SSTAXEQ..
   SSTAX =E= SUM[c,TSS(c)*PQS(c)*QQ(c)] ;
```

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Tax Revenue Equations

```
EXTAXEQ..
  EXTAX =E= SUM[c,TEX(c)*QQ(c)] ;

VTAXEQ..
  VTAX =E= SUM[(c,h),TV(c)*PQD(c)*QCD(c,h)] ;

ITAXEQ..
  ITAX =E= SUM[a,TX(a)*PX(a)*QX(a)] ;
```

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Tax Revenue Equations

```
FTAXEQ..
  FTAX =E= SUM[(f,a),TF(f,a)
             * WF(f) * WFDIST(f,a) * FD(f,a)] ;

FYTAXEQ..
  FYTAX =E= SUM[f,TYF(f)*(YF(f)*(1-deprec(f)))] ;

DTAXEQ..
  DTAX =E= SUM[h,TYH(h)*YH(h)]
           + SUM[e,TYE(e)*YE(e)] ;
```


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Tax Instruments & Revenues

The End

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